Discovering the Connection:

Your Environment, Your Health

Afterschool Science Club Curriculum for Middle School Students

Unit 4: Food Safety

Developed by K-12 Specialized Information Services group,
National Library of Medicine, National Institutes of Health

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About Discovering the Connection: Your Environment, Your Health

Purpose of the Curriculum

Discovering the Connection: Your Environment, Your Health uses the Tox Town Web site (toxtown.nlm.nih.gov) developed by the National Library of Medicine (NLM) to introduce middle school students to environmental health issues in everyday life. The curriculum includes information and laboratory research and communication activities, stressing the relevance of science to informed citizenship and integrating science, society, and literacy. The curriculum is for an afterschool club, but can also be used in the science classroom. The curriculum is based on National Science Education Standards.

Teaching and Learning Approaches

The curriculum uses inquiry-based learning and problem-based learning approaches. These are student-centered approaches that promote in-depth understanding and critical thinking by fostering students' active engagement with the subject matter. Students develop content knowledge and scientific reasoning skills through collaborative work on real world problems. They explore ideas, formulate meaningful questions, collect and analyze data, and evaluate and communicate their findings.

Tox Town Web Site

Tox Town (toxtown.nlm.nih.gov) is visually engaging and is an authoritative, reliable educational Web site, dedicated to highlighting the connections among chemicals, the environment, and the public's health.

Curriculum Development Team

This effort was initiated and coordinated by the NLM K-12 Specialized Information Services group. The NLM, one of the institutes of the National Institutes of Health (NIH), has been a center of information innovation since its founding in 1836. The K-12 group develops authoritative resources for a variety of science education areas, coordinates outreach to educators and school health professionals, and conducts research into teaching and learning.

The working group for this curriculum consists of: the NLM K-12 staff; Daniel M. Levin, a professor of science education from the University of Maryland College of Education; and five teachers from Montgomery County, MD, and the District of Columbia. The teachers are Jacquelyn Geer (science), Maura Hinkle (science), Sandra Garner (language arts), Kelley Knox (social studies), and Berneatta Barnes (science).

Curriculum Overview and Suggested Use

The curriculum contains six units. Each unit introduces one environmental health topic and includes three or four 50-60 minute lessons in the following format:

- Topic introduction and information research activity using Tox Town;
- Hands-on experiment or activity reinforcing understanding, conducted with simple materials; and
- Communication and social action activity where students share their understanding of the topic with others and translate their understanding into actions.

The units can be used sequentially or individually to support the existing middle school science curriculum. They can also be used to support the science/society connection in the social science or language arts classroom. The entire curriculum was pilot-tested as an afterschool club at the Cabin John Middle School, Montgomery County, MD.

The Six Units of the Curriculum

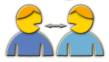
1. ***Water Quality:*** Introduces students to drinking water quality issues and the water treatment process. Includes experiments where students test school drinking water, compare it with water from other sources, and communicate the findings to the school community.
2. ***Air Quality:*** Introduces students to air quality issues and the impact of air pollution on human health. Students test air quality in several locations in and around the school.
3. ***Chemicals in Your Home:*** Informs students about potentially toxic chemicals in common products and introduces safer alternatives.
4. ***Food Safety:*** Introduces students to biological, chemical, and physical contaminants in food. Uses an experiment to teach safe food handling.
5. ***Runoff, Impervious Surfaces, and Smart Development:*** Introduces students to the relationship among runoff, water pollution, and human health. Also introduces the idea of responsible development.
6. ***The Great Debate: Bottled Water vs. Tap Water in Our School:*** Students perform research about pros and cons of different sources of drinking water, engage in a debate, and develop persuasive arguments to advocate for bottled or tap water as a primary source of drinking water in the school.

Symbols Used in This Curriculum

 – information research via Tox Town

 – lab experiment

 – hands-on activity

 – communication and social action activity

 – excerpt from student handouts in teacher directions

Unit 4: Food Safety

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Unit 4: Food Safety

Unit Overview

This unit uses the Tox Town Web site (toxtown.nlm.nih.gov) developed by the National Library of Medicine to introduce students to environmental health issues in their everyday life through *inquiry-based learning* and *problem-based learning* approaches. Inquiry-based learning is a student-centered approach that promotes in-depth understanding and critical thinking by fostering students' active engagement with the subject matter. Students explore ideas, formulate meaningful questions, collect and analyze data, and evaluate and communicate their findings. Problem-based learning is another student-centered approach, where students develop content knowledge and scientific reasoning skills through collaborative work on real world problems.

National Science Education Standards

M.C.3 Regulation and Behavior

a. All organisms must be able to obtain and use resources, grow, reproduce, and maintain stable internal conditions while living in a constantly changing external environment.

M.F.4 Risks and Benefits

b. Students should understand the risks associated with natural hazards (fires, floods, tornadoes, hurricanes, earthquakes, and volcanic eruptions), with chemical hazards (pollutants in air, water, soil, and food), with biological hazards (pollen, viruses, bacterial, and parasites), social hazards (occupational safety and transportation), and with personal hazards (smoking, dieting, and drinking).

Unit Objectives

Upon completion of this unit, students will be able to:

- Describe how biological and chemical agents can lead to food contamination
- Describe ways to prevent food contamination and foodborne illnesses
- Communicate effective food contamination prevention methods

Essential Question

How can we prevent biological and chemical food contamination that can lead to foodborne illnesses?

Technology Education Skills

Students will use computer resources to explain biological and chemical food contamination, its impact on human health, and prevention of contamination.

L 4.1 Did Someone Say "Food Fight"?

L 4.1.1 Objectives, Materials, and Teacher Preparation

Objectives

Students will be able to:

- Describe how food can get contaminated with biological and chemical agents during food production or at home
- Describe ways to prevent food contamination

Materials Needed for Lesson

- *Food Contaminants Definitions* (H 4.1.1)
- *Food Contaminants Investigation Sheet* (H 4.1.2)
- Computers with Internet access

Teacher Preparation

1. Prepare copies of *Food Contaminants Definitions* (H 4.1.1) and *Food Contaminants Investigation Sheet* (H 4.1.2)
2. Ensure access to computers with Internet connection (for accessing Tox Town, toxtown.nlm.nih.gov).

L 4.1.2 Activator

Teacher Directions

1. Create a four-column chart on the white/black board, with the following column headings:
   - Sandwich from local deli
   - Shellfish bought in a store and prepared at home
   - Steak cooked at a neighborhood barbecue or party
   - Vegetable salad from a restaurant buffet salad bar
2. Point to the column headers. Ask the students, "Can eating the following foods make you sick?" Have students vote, and record their results in the chart.
3. For each category where there is a "yes," ask, "How can this food get contaminated with something that makes you sick?" List situations on the chart.
4. Say, "Food contaminants can be divided into biological, chemical, and physical sources." Distribute *Food Contaminants Definitions* (H 4.1.1). Ask students to label each of the situations on the board as biological, chemical, or physical.

L 4.1.3 Activity

Teacher Directions

1. Distribute *Food Contaminants Investigation Sheets* (H 4.1.2) to groups of students.
2. Assign each group one of the four foods discussed in the Activator.
3. Ask the students to complete the task on the *Food Contaminants Investigation Sheet* (H 4.1.2).

Please, circle the food you are investigating:

Sandwich from local deli	Shellfish bought in a store and prepared at home	Steak cooked at a neighborhood barbecue or party	Vegetable salad from a restaurant buffet salad bar

Research Tox Town to find out more about possible contaminants in the food you are investigating. Depending on your food, look at the following Tox Town and other Web pages:

Sandwich from local deli:

Food Services (Tox Town) - toxtown.nlm.nih.gov/text_version/locations.php?id=26

Safe Food Handling (Partnership for Food Safety Education) - fightbac.org/safe-food-handling

Food Safety (MedlinePlus) - www.nlm.nih.gov/medlineplus/foodsafety.html

Shellfish bought in a store and prepared at home:

Algae Blooms (Tox Town) - toxtown.nlm.nih.gov/text_version/locations.php?id=3

Shellfishing (Tox Town) - toxtown.nlm.nih.gov/text_version/locations.php?id=52

Food Safety (Federal Food Safety Information) - foodsafety.gov

Steak cooked at a neighborhood barbecue or party:

Safe Food Handling (U.S. Department of Agriculture) - www.fsis.usda.gov/Fact_Sheets/Basics_for_Handling_Food_Safely

Food Safety (Federal Food Safety Information) - foodsafety.gov

Barbecue Bliss: Keeping Bacteria at Bay (U.S. Food and Drug Administration) - www.fda.gov/ForConsumers/ConsumerUpdates/ucm259916.htm

Vegetable salad from a restaurant buffet salad bar:

Food Services (Tox Town) - toxtown.nlm.nih.gov/text_version/locations.php?id=26

Safe Food Handling (Partnership for Food Safety Education) - fightbac.org/safe-food-handling

Food Safety (Federal Food Safety Information) - foodsafety.gov

Use the chart below to list possible hazards and safety precautions associated with handling the food you are investigating.

4. Have students discuss their answers and ways they can prevent chemical and biological hazards from contaminating food.
5. Collect and save completed *Food Contaminants Investigation Sheets* (H 4.1.2). They will be used again in Lesson 4.3 of this unit.

L 4.2 How Clean is Your Salad? Lab Activity 

L 4.2.1 Objectives, Materials, and Teacher Preparation

Objectives

Students will be able to:

- Perform a science experiment that will demonstrate the effectiveness of different fruit and vegetable washing solutions
- Explain the importance of washing fruit and vegetables

Materials Needed for Lesson

Fruit/Vegetables Preparation

- Demonstration apple (will not be sprayed/washed)
- Apples (three per group)
- Spinach leaves (nine per group)
- Fresh broccoli florets (nine per group)
- Vegetable (or other) oil
- Cornstarch

Lab

- Measuring cups (one per group)
- Measuring spoons (1/2 tablespoon per group)
- Funnels (one per group)
- Spray bottles (two per group)
- Large beakers (one per group)
- Mixing spoons (one per group)
- White distilled vinegar
- Lemon juice
- Baking soda
- Large plates (one per group)
- Large bowls (one per group)
- Paper towels (three sheets per group)
- Permanent markers
- Masking tape
- Vegetable scrub brush (one per group)
- Colander (one per group)
- Sink with running water

Handouts

- *What Are Pesticides?* (H 4.2.1)
- *Vegetable Wash Lab Instructions* (H 4.2.2)
- *Data Analysis Sheet* (H 4.2.3)
- *Lab Rubric* (H 4.2.4)

Teacher Preparation

1. Prepare copies of *What Are Pesticides*? (H 4.2.1), *Vegetable Wash Lab Instructions* (H 4.2.2), *Data Analysis Sheet* (H 4.2.3), and *Lab Rubric* (H 4.2.4).
2. For this lab, you will prepare fruit and vegetables by sprinkling them with an "imitation pesticide" - cornstarch. To help the cornstarch to adhere, lightly spray spinach leaves, apples, and broccoli florets with corn, vegetable, or olive oil. Then dust them with cornstarch. The sprinkled fruit and vegetables represent conventional (non-organic) fruit and vegetables, sprinkled with pesticides.
3. Set up a lab table with three bowls of "starched" fruit/vegetables: one with apples, one with spinach, and one with broccoli. Put a set of plates next to the bowls. Put three paper towels on top of each plate.
4. Arrange the other materials on the lab table for easy student access.

L 4.2.2 Activator

Teacher Directions

1. Hold out the "demonstration apple" and ask the students, "Would you eat this apple?" After students respond, ask, "What would you do before eating it?" If students don't mention washing the apple, prompt them.
2. Ask, "Why do we wash fruit and vegetables?" Elicit responses about hazardous things that can be on unwashed fruit/vegetables. Ask whether all hazardous things will be seen with a naked eye. Refer to the first lesson of this unit and ask whether potential hazards are biological, chemical, or physical.
3. Distribute *What Are Pesticides?* (H 4.2.1); discuss the handout with the students.
4. Show this eight-minute video about pesticides and food safety to the students:

Link: Greenscene: Pesticides and Food Safety (Environmental Protection Agency) - yosemite.epa.gov/opa/mmwebcon.nsf/HTML/KCHK-7QGLEF?OpenDocument

5. Ask, "Based on the information you received in the video, will you eat this apple knowing that it was sprayed with pesticides?"

L 4.2.3 Activity

Teacher Directions

1. Assign students to groups.
2. Distribute *Vegetable Wash Lab Instructions* (H 4.2.2), *Data Analysis Sheet* (H 4.2.3), and *Lab Rubric* (H 4.2.4). Discuss the purpose of the lab, in *Vegetable Wash Lab Instructions* (H 4.2.2), explaining that students will be testing the effectiveness of different fruit and vegetable washing solutions.
3. Explain that the fruit/vegetables will be spinach, apples, and broccoli. Demonstrate your prepared fruit/vegetables and explain that cornstarch represents pesticides used to spray fruit/vegetables.
4. Ask each group to take one large plate with three apples, nine spinach leaves, and nine broccoli florets, and bring it to their table.
5. Refer to the *Vegetable Wash Lab Instructions* (H 4.2.2) and discuss the washing solutions preparation with the students. Ask students what they think is the most effective way to wash off cornstarch (or pesticides): plain water, solution 1, or solution 2.
6. Ask students which of the fruit/vegetables on their plates is easiest to clean and which is the most difficult.

7. Ask students to record two hypotheses on *Vegetable Wash Lab Instructions* (H 4.2.2): one concerning the washing solution effectiveness, and the other concerning the ease/difficulty of cleaning their fruit/vegetables.
8. Instruct each group to prepare the two solutions by following the directions on the *Vegetable Wash Lab Instructions* (H 4.2.2).

Washing solutions preparation:

1. Prepare fruit/vegetable washing solution 1 by pouring 1/4 cup white distilled vinegar and 3/4 cup of water into the beaker and gently mixing the solution with the mixing spoon.
2. Using the funnel, pour the solution into a spray bottle. Label a piece of masking tape as washing solution 1 and attach the label to the spray bottle.
3. Prepare fruit/vegetable washing solution 2 by pouring 1/2 cup white distilled vinegar and 1/2 cup of water into the beaker. Add one tablespoon of lemon juice and one tablespoon of baking soda. (You will get some fizzing.) Gently mix the solution with the mixing spoon.
4. Using the funnel, pour the solution into the second spray bottle. Label a piece of masking tape as washing solution 2 and attach the label to the spray bottle.

9. Instruct students to wash fruit/vegetables using the three methods described on the *Vegetable Wash Lab Instructions* (H 4.2.2).

Washing fruit/vegetables:

5. Take three sheets of paper towels and label them with a permanent marker as 1) water washed, 2) water + solution 1, and 3) water + solution 2.
6. Thoroughly wash one apple, three spinach leaves, and three broccoli florets using a colander and cool running water. Use the vegetable brush if you can. Place them on the paper towel labeled "water washed."
7. Thoroughly wash one apple, three spinach leaves, and three broccoli florets using a colander and cool running water. Use the vegetable brush if you can. After you are done, place your fruit and vegetables in a bowl and spray them with solution 1. Let them sit for two to five minutes. Next, rinse them in cool water (once again, feel free to use the brush) and place them on the paper towel labeled "water + solution 1." Rinse the bowl.
8. Repeat Step 7 with solution 2.
9. Compare each set of washed vegetables.
10. Record your observations and conclusion on *Data Analysis Sheet* (H 4.2.3) and complete *Lab Rubric* (H 4.2.4).
11. Clean up your materials.

10. Open a discussion about what the experiment taught students about washing fruit/vegetables.

L 4.3 Spreading the Message About Food Safety 

L 4.3.1 Objectives, Materials, and Teacher Preparation

Objectives

Students will be able to:

- Communicate about ways to prevent food contamination in various situations by creating a poster

Materials Needed for Lesson

- Poster boards
- Construction paper
- Scissors
- Glue
- Markers/color pencils/crayons
- *Food Safety Poster Activity* (H 4.3.1)
- Copies of completed *Food Contaminants Investigation Sheet* (H 4.1.2) from Lesson 4.1
- Computers with Internet access

Teacher Preparation

1. Make several copies of completed *Food Contaminants Investigation Sheet* (H 4.1.2) from Lesson 4.1. These will be used for background information. Make several copies of each completed sheet and make them available to the students for references.
2. Make copies of *Food Safety Poster Activity* (H 4.3.1), one for each student.
3. Ensure access to computers with Internet connection.

L 4.3.2 Activity

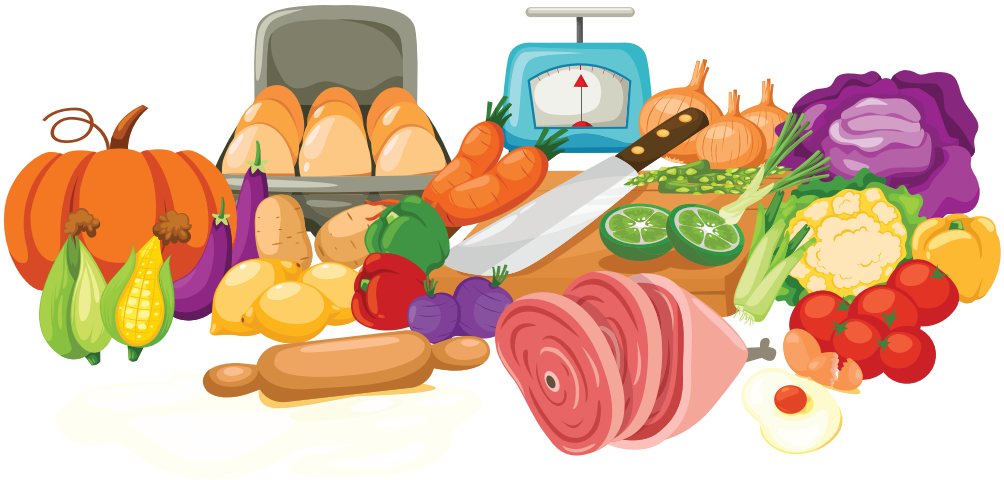
Teacher Directions

1. Distribute *Food Safety Poster Activity* (H 4.3.1) and poster boards (one for each student).
2. Distribute art materials (pencils, crayons, etc.).
3. Ask students to follow the instructions on *Food Safety Poster Activity* (H 4.3.1).

Student Handouts

H 4.1.1 Food Contaminants Definitions

Name(s): _____ Date: _____



Biological hazards

Biological hazards include bacteria, viruses, parasites, and toxins in food produced by organisms, which can be harmful to human health. Biological hazards cause most cases of foodborne illness.

Some common biological hazards are salmonella and E. coli *(Escherichia coli)*.

Chemical hazards

Chemical hazards are substances or dangerous chemicals in food that can be harmful to human health. In some cases, the chemical is added to the food intentionally, but the amount exceeds the allowable limit. In other cases, the chemical is added unintentionally.

An example of an intentionally added chemical hazard is a food preservative. It is intended to keep the food from spoiling, but consuming large amounts of it may be harmful to human health. An example of an unintentionally added chemical hazard is cleaning solution, used to clean kitchen surfaces, that accidentally contaminates food.

Physical hazards

Physical hazards are hard or sharp objects in food that can be harmful to human health. These can be naturally occurring objects, such as bones in fish, or things accidentally introduced during food preparation or handling.

Common physical hazards include glass (e.g., from broken glass containers), metal (e.g., splinters from food preparation equipment), plastics (e.g., pieces of food packaging materials), stones (e.g., small stones picked up during crop harvesting), and wood (e.g., from food storage containers).

H 4.1.2 Food Contaminants Investigation Sheet

Name(s): _____ Date: _____

Directions:

Please circle the food you are investigating:

Sandwich from local deli

Shellfish bought in a store and prepared at home

Steak cooked at a neighborhood barbecue or party

Vegetable salad from a restaurant buffet salad bar

Research Tox Town to find out more about possible contaminants in the food you are investigating. Depending on your food, look at the following Tox Town and other Web pages:

Sandwich from local deli:

Food Services (Tox Town) - toxtown.nlm.nih.gov/text_version/locations.php?id=26

Safe Food Handling (Partnership for Food Safety Education) - fightbac.org/safe-food-handling

Food Safety (MedlinePlus) - www.nlm.nih.gov/medlineplus/foodsafety.html

Shellfish bought in a store and prepared at home:

Algae Blooms (Tox Town) - toxtown.nlm.nih.gov/text_version/locations.php?id=3

Shellfishing (Tox Town) - toxtown.nlm.nih.gov/text_version/locations.php?id=52

Food Safety (Federal Food Safety Information) - foodsafety.gov

Steak cooked at a neighborhood barbecue or party:

Safe Food Handling (U.S. Department of Agriculture) - www.fsis.usda.gov/Fact_Sheets/Basics_for_Handling_Food_Safely

Food Safety (Federal Food Safety Information) - foodsafety.gov

Barbecue Bliss: Keeping Bacteria at Bay (U.S. Food and Drug Administration) - www.fda.gov/ForConsumers/ConsumerUpdates/ucm259916.htm

Vegetable salad from a restaurant buffet salad bar:

Food Services (Tox Town) - toxtown.nlm.nih.gov/text_version/locations.php?id=26

Safe Food Handling (Partnership for Food Safety Education) - fightbac.org/safe-food-handling

Food Safety (Federal Food Safety Information) - foodsafety.gov

Use the chart below to list possible hazards and safety precautions associated with handling the food you are investigating.

Food Name:_____

Biological Hazards	Chemical Hazards	Physical Hazards
Prevention		

H 4.2.1 What Are Pesticides?

Name(s): _____ Date: _____

(Adapted from epa.gov/kidshometour/pest.htm)

Pesticides: The Bad and the Good

Pesticides are substances or mixtures that are intended to prevent, destroy, or repel pests. Pests can be insects, mice, animals, weeds, fungi, or microorganisms such as bacteria and viruses. Most pesticides contain chemicals that can be harmful to crops, people, animals, or the environment. For this reason, the Office of Pesticide Programs of the Environmental Protection Agency regulates pesticides in the United States to protect public health and the environment. Pesticides can vary in how toxic they are to humans and the environment.

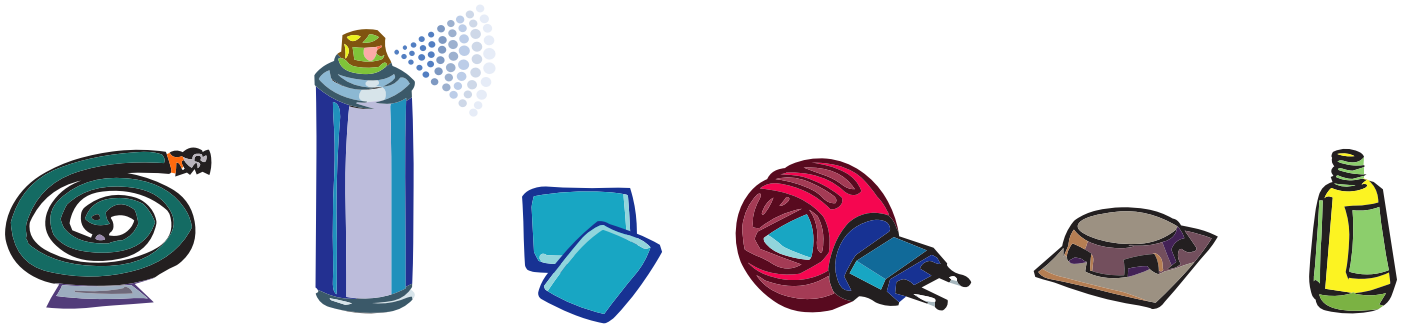
Examples of Pesticides

Here are some pesticide products we use in our homes:

- Cockroach sprays and baits
- Mosquito sprays
- Rat poisons
- Flea and tick sprays, powders, and pet collars
- Cleaning products used to remove the mildew on bathroom tiles
- Household plant sprays
- Lawn and garden products to kill insects and weeds
- Some swimming pool chemicals

What's the Good?

There are some pesticides that are made from natural materials such as animals, plants, bacteria, and minerals. For example, canola oil and baking soda can be used on crops to control insects. These pesticides are considered biopesticides and are generally less toxic to human health and the environment than pesticides made with harsh chemicals.



H 4.2.2 Vegetable Wash Lab Instructions

Name(s): _____ Date: _____

Testable Question: Which vegetable washing solution will make non-organic fruit and vegetables the safest to eat?

_____

_____

Hypothesis 1 (about washing solutions): _____

_____

_____

_____

_____

Hypothesis 2 (about fruit/vegetables): _____

_____

_____

_____

_____

Materials:

- Three apples, nine spinach leaves, nine fresh broccoli florets per group, dusted with cornstarch (prepared by your teacher)
- Measuring cups (one per group)
- Measuring spoons (1/2 tablespoon per group)
- Funnels (one per group)
- Spray bottles (two per group)
- Large beakers (one per group)
- Mixing spoons (one per group)
- White distilled vinegar
- Lemon juice
- Baking soda
- Large plates (one per group)
- Large bowls (one per group)
- Paper towels (three sheets per group)
- Permanent markers
- Masking tape
- Vegetable scrub brush (one per group)
- Colander (one per group)

Procedure:

Washing solutions preparation:

1. Prepare fruit/vegetable washing solution 1 by pouring 1/4 cup white distilled vinegar and 3/4 cup of water into the beaker and gently mixing the solution with the mixing spoon.
2. Using the funnel, pour the solution into a spray bottle. Label a piece of masking tape as washing solution 1 and attach the label to the spray bottle.
3. Prepare fruit/vegetable washing solution 2 by pouring 1/2 cup white distilled vinegar and 1/2 cup of water into the beaker. Add one tablespoon of lemon juice and one tablespoon of baking soda. (You will get some fizzing.) Gently mix the solution with the mixing spoon.
4. Using the funnel, pour the solution into the second spray bottle. Label a piece of masking tape as washing solution 2 and attach the label to the spray bottle.

Washing fruit/vegetables:

5. Take three sheets of paper towels and label them with a permanent marker as 1) water washed, 2) water + solution 1, and 3) water + solution 2.
6. Thoroughly wash one apple, three spinach leaves, and three broccoli florets using a colander and cool running water. Use the vegetable brush if you can. Place them on the paper towel labeled "water washed."
7. Thoroughly wash one apple, three spinach leaves, and three broccoli florets using a colander and cool running water. Use the vegetable brush if you can. After you are done, place your fruit and vegetables in a bowl and spray them with solution 1. Let them sit for two to five minutes. Next, rinse them in cool water (once again, feel free to use the brush) and place them on the paper towel labeled "water + solution 1." Rinse the bowl.
8. Repeat Step 7 with solution 2.
9. Compare each set of washed vegetables.
10. Record your observations and conclusion on *Data Analysis Sheet* (H 4.2.3) and complete *Lab Rubric* (H 4.2.4).
11. Clean up your materials.

H 4.2.3 Data Analysis Sheet

Name(s): _____ Date: _____

1. Which method cleaned the apples the best?

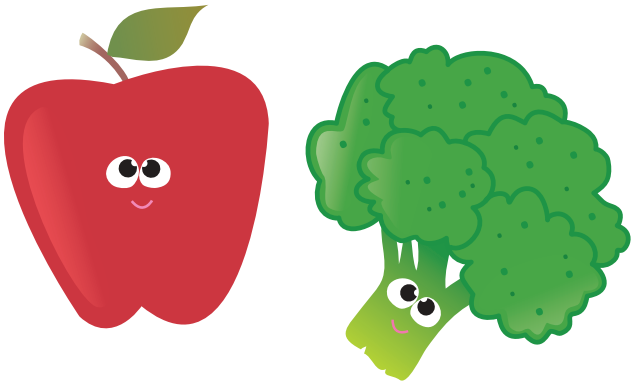
❑ Water ❑ Solution 1 ❑ Solution 2

2. Which method cleaned the broccoli the best?

❑ Water ❑ Solution 1 ❑ Solution 2

3. Which method cleaned the spinach the best?

❑ Water ❑ Solution 1 ❑ Solution 2



4. Is there one fruit/vegetable that the spray wash did not work well on?

_____

5. Conclusion: Why do you think the method that worked best was so effective?

_____

_____

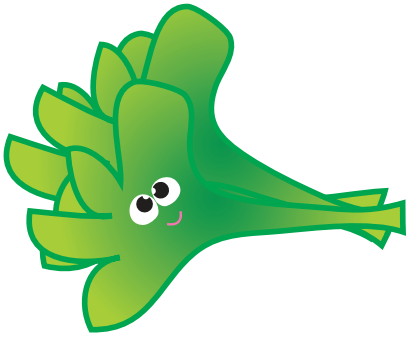
_____

_____

_____

_____

_____



H 4.2.4 Lab Rubric 

Name(s): _____ Date: _____

Hypothesis Rubric	
Did you have a hypothesis about which cleaning method would work best?	___yes ___ no
Did you have a hypothesis about which fruit/vegetable is easiest (or most difficult) to clean?	___yes ___ no
Total	**_____/2**

Data Analysis/Conclusion Rubric	
Did you answer which method cleaned the spinach the best?	___yes ___ no
Did you answer which method cleaned the apples the best?	___yes ___ no
Did you answer which method cleaned the broccoli the best?	___yes ___ no
Did you answer whether one vegetable or fruit did not wash well?	___yes ___ no
Did your conclusion explain why the best method worked well?	___yes ___ no
Total	**_____/5**

H 4.3.1 Food Safety Poster Activity

Name(s): _____ Date: _____

Directions:

Get the word out! Help your family, friends, and neighbors to understand the importance of food safety by creating a poster.

1. Choose a scenario you will work with (circle one):

Keeping your neighborhood barbecue safe

Food safety at home

Food safety on a camping trip

2. Complete the following table with prevention/safety steps that are relevant to your scenario. Draw upon your completed *Food Contaminants Investigation Sheet* (H 4.1.2) from the first lesson of this unit, as well as the Web sites listed on that handout for background information.

Prevention Step	Rationale (why this is important)

3. Create your poster on a poster board using colored pencils, markers, or crayon.
4. Exchange and share:

   When you are done creating your poster, exchange what you have done with your neighbor, and answer the following questions:

   A. What is one prevention method that your neighbor has in his/her message that is different from your message?

   B. Why is it important?

Unit 4 Glossary

The following vocabulary is featured in Unit 4 of the Tox Town curriculum.

algae blooms—Algae are tiny rootless plants that grow in water and are an important part of the marine food web. Most algae species are harmless. Harmful algae blooms, or HABs, occur when toxic algae species grow quickly and form clusters that make the ocean look red or brown. Algae blooms can block the sunlight that other marine organisms need. Extremely large algae blooms can deplete the oxygen in the bottom waters of lakes, estuaries, and coastal environments.

bacteria—Bacteria is the plural for bacterium, which is any one-celled organism. Bacteria are usually associated with the cause of diseases.

biological food hazards—Biological food hazards include bacteria, viruses, parasites, and toxins in food produced by organisms, which can be harmful to human health. Biological hazards cause most cases of foodborne illness.

biopesticides—Pesticides made from natural materials such as animals, plants, bacteria, and certain minerals.

chemical food hazards—Chemical food hazards are substances or dangerous chemicals in food that can be harmful to human health. In some cases, the chemical is added to the food intentionally, but the amount exceeds the allowable limit. In other cases, the chemical is added unintentionally.

contaminate—To pollute.

contaminant—A substance that makes something polluted.

cross-contamination—Cross-contamination occurs when bacteria are spread from one source to another source.

environmental health—Environmental health is the field of science that studies how the environment influences human health and disease. "Environment," in this context, means things in the natural environment like air, water, and soil and also all the physical, chemical, biological, and social features of our surroundings.

fertilizer—Any substance added to soil to increase its ability to support any plant growth.

irradiation—Irradiation is a process that involves exposing materials to light rays to kill bacteria. Food irradiation is the treatment of food with high energy such as gamma rays, electron beams, or X-rays as a means of cold pasteurization, which destroys living bacteria to control foodborne illnesses. The United States relies exclusively on the use of gamma rays, which are similar to ultraviolet light and microwaves and pass through food, leaving no residue.

microorganism—A microorganism is any organism so small that it can be seen only with the aid of a microscope.

organic—Organic foods have been grown without fertilizers and pesticides, and have not been treated with antibiotics, hormones, or synthetic additives such as dyes and preservatives.

organism—Any living thing.

pesticide—Pesticides are substances that prevent, destroy, repel, or reduce the severity of pests. Pests are any living things that occur where they are not wanted. Pests can be any number of bugs, mammals, unwanted plants, bacteria, viruses, or fungi. Pesticides are common chemicals found in thousands of household and industrial products. Pesticides can vary in how toxic they are to humans and the environment.

physical food hazards—Physical food hazards are hard or sharp objects in food that can be harmful to human health. These can be naturally occurring objects, such as bones in fish, or things accidentally introduced during food preparation or handling.

sanitize—To sanitize is to make clean or more acceptable in terms of health. A sanitary environment would be one that is hygienic or free of germs.

unsanitary—Unclean (see also sanitize).